

Appl. No. 09/669,354
Amdt. Dated January 12, 2004
Reply to Office Action of August 12, 2003

Attorney Docket No. 81751.0009
Customer No. 26021

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An electro-optical device comprising:

a display section which includes a plurality of first electrodes extending in a first direction, a plurality of second electrodes extending in a second direction crossing the first direction, and electro-optical elements driven by the first and second electrodes;

a first driver which drives the first electrodes; and

a second driver which drives the second electrodes,

wherein the first driver has a master IC for driving a first group of the first electrodes, and at least one slave IC for driving a second group of the first electrodes;

wherein the master IC has a display control signal generation section which generates a display control signal based on a signal from an external MPU; [[and]]

wherein the master IC has an output terminal for outputting the display control signal from the display control signal generation section of the master IC;
and

wherein each of the master IC and the at least one slave IC has an input terminal for receiving the display control signal output from the display control signal generation section of the master IC through an external wiring which is connected to the output terminal of the master IC.

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2. (Currently Amended) ~~The electro-optical device as defined in claim 1~~
An electro-optical device, comprising:

a display section which includes a plurality of first electrodes extending in a first direction, a plurality of second electrodes extending in a second direction crossing the first direction, and electro-optical elements driven by the first and second electrodes;

a first driver which drives the first electrodes; and
a second driver which drives the second electrodes.

wherein the first driver has a master IC for driving a first group of the first electrodes, and at least one slave IC for driving a second group of the first electrodes;

wherein the master IC has a display control signal generation section which generates a display control signal based on a signal from an external MPU; and

wherein each of the master IC and the at least one slave IC has an input terminal for receiving the display control signal output from the display control signal generation section of the master IC through an external wiring,


wherein each of the master IC and the at least one slave IC comprises:
a display memory into which display data from the external MPU is written;
a display address circuit which assigns a display address for the display data which is read out from the display memory and displayed in the display section; and

a driver which supplies a data signal based on the display data read out from the display memory to the first electrodes, and

wherein the display control signal input through the input terminal is supplied to the display address circuit and the driver.

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3. (Currently Amended) The electro-optical device as defined in claim 1

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wherein a gray scale display is performed in the display section based on a pulse width modulation signal output from the master IC and the at least one slave IC; and

wherein the display control signal generated in the display control signal generation section includes a gray scale control pulse for generating the pulse width modulation signal.

4. (Currently Amended) An electronic apparatus including an electro-optical device comprising:

a display section which includes a plurality of first electrodes extending in a first direction, a plurality of second electrodes extending in a second direction crossing the first direction, and electro-optical elements driven by the first and second electrodes;

a first driver which drives the first electrodes; and

a second driver which drives the second electrodes,

wherein the first driver has a master IC for driving a first group of the first electrodes, and at least one slave IC for driving a second group of the first electrodes;

wherein the master IC has a display control signal generation section which generates a display control signal based on a signal from an external MPU; [[and]]

wherein the master IC has an output terminal for outputting the display control signal from the display control signal generation section of the master IC;
and

wherein each of the master IC and the at least one slave IC has an input terminal for receiving the display control signal output from the display control

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~~signal generation section of the master IC through an external wiring which is connected to the output terminal of the master IC.~~

5. (Original) An electro-optical device comprising:

a display section which includes a plurality of first electrodes extending in a first direction, a plurality of second electrodes extending in a second direction crossing the first direction, and electro-optical elements driven by the first and second electrodes;

a first driver which drives the first electrodes; and
a second driver which drives the second electrodes,

wherein the first driver has a master IC for driving a first group of the first electrodes and at least one slave IC for driving a second group of the first electrodes;
wherein the master IC comprises:

a display control signal generation section which generates a display control signal based on a signal from an external MPU;

an internal delay circuit which delays the display control signal; and
an output terminal which outputs the display control signal before the display control signal passes through the internal delay circuit; and

wherein the at least one slave IC has an input terminal for receiving the display control signal output from the output terminal of the master IC through an external wiring.

6. (Original) The electro-optical device as defined in claim 5,
wherein the signal delay in the internal delay circuit is variable.

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7. (Previously Presented) An electronic apparatus including an electro-optical device comprising:

a display section which includes a plurality of first electrodes extending in a first direction, a plurality of second electrodes extending in a second direction crossing the first direction, and electro-optical elements driven by the first and second electrodes;

a first driver which drives the first electrodes; and

a second driver which drives the second electrodes,

wherein the first driver has a master IC for driving a first group of the first electrodes and at least one slave IC for driving a second group of the first electrodes;

wherein the master IC comprises:

a display control signal generation section which generates a display control signal based on a signal from an external MPU;

an internal delay circuit which delays the display control signal; and

an output terminal which outputs the display control signal before the display control signal passes through the internal delay circuit; and
wherein the at least one slave IC has an input terminal for receiving the display control signal output from the output terminal of the master IC through an external wiring.

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8. (Original) A display driver IC which drives electro-optical elements by supplying a data signal to a plurality of electrodes, the display driver IC comprising:
- an interface circuit to which address data, display data and command are input through an external MPU;
 - an address circuit which generates an address signal based on the address data from the interface circuit;
 - a display memory into which the display data from the interface circuit is written according to the address signal from the address circuit;
 - a display control signal generation section which generates a display control signal based on a signal from the interface circuit;
 - a display address circuit which generates a display address for the display data to be read out from the display memory and displayed in a display section based on the display control signal;
 - a driver which supplies the data signal to the plurality of electrodes based on the display data read out from the display memory and the display control signal;
 - a selection terminal for selecting either a master or a slave;
 - an output terminal for outputting the display control signal generated in the display control signal generation section; and
 - an input terminal to which the display control signal is input from an external device;
- wherein the display control signal generation section is enabled and the display control signal is output from the output terminal when the display driver IC is set as a master by the selection terminal; and
- wherein the display control signal generation section is disabled when the display driver IC is set as a slave by the selection terminal.

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9. (Original) The display driver IC as defined in claim 8, further comprising:

an input/output terminal which is provided in place of the output terminal and capable of being switched from a state of outputting the display control signal generated in the display control signal generation section to a state in which the display control signal is input from an external device and vice versa; and

a signal selection circuit for selecting the transition state of the logic of one of the display control signal input through the input/output terminal and the display control signal input through the input terminal,

wherein the display control signal is output from the input/output terminal when the display driver IC is set as a master by the selection terminal; and

wherein the display control signal is input through the input/output terminal when the display driver IC is set as a slave by the selection terminal.

10. (Original) The display driver IC as defined in claim 9, wherein the signal selection circuit includes an AND circuit.

11. (Original) The display driver IC as defined in claim 9, wherein the signal selection circuit includes an OR circuit.

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12. (Original) A display driver IC which drives electro-optical elements by supplying a data signal to a plurality of electrodes, the display driver IC comprising:
- an interface circuit to which address data, display data and command are input through an external MPU;
 - an address circuit which generates an address signal based on the address data from the interface circuit;
 - a display memory into which the display data from the interface circuit is written according to the address signal from the address circuit;
 - a display control signal generation section which generates a display control signal based on a signal from the interface circuit;
 - a display address circuit which generates a display address for the display data to be read out from the display memory and displayed in a display section based on the display control signal;
 - a driver which supplies the data signal to the plurality of electrodes based on the display data read out from the display memory and the display control signal;
 - a selection terminal for selecting either a master or a slave;
 - an output terminal for outputting the display control signal generated in the display control signal generation section;
 - an internal delay circuit which delays the display control signal generated in the display control signal generating circuit;
 - an input terminal to which the display control signal is input from an external device; and
 - a signal selection circuit for selecting the transition state of the logic of one of the display control signal input through the internal delay circuit and the display control signal input through the input terminal,

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wherein the display control signal generation section is enabled, and the display control signal generated in the display control signal generation section is output through the output terminal and input to the internal delay circuit, when the display driver IC is set as a master by the selection terminal; and

wherein the display control signal generation section is disabled when the display driver IC is set as a slave by the selection terminal.

13. (Original) The display driver IC as defined in claim 12, further comprising,

an input/output terminal which is provided in place of the output terminal and capable of being switched from a state of outputting the display control signal generated in the display control signal generation section to a state in which the display control signal is input from an external device and vice versa,

wherein the signal selection circuit selects the transition state of the logic of one of the display control signal input through the input/output terminal, the display control signal input through the internal delay circuit, and the display control signal input through the input terminal;

wherein the display control signal is output from the input/output terminal when the display driver IC is set as a master by the selection terminal; and

wherein the display control signal is input through the input/output terminal when the display driver IC is set as a slave by the selection terminal.

14. (Original) The display driver IC as defined in claim 12, wherein the signal selection circuit includes an AND circuit.

15. (Original) The display driver IC as defined in claim 12, wherein the signal selection circuit includes an OR circuit.

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16. (Currently Amended) [The electro-optical device as defined in claim 4] An electronic apparatus including an electro-optical device comprising:
a display section which includes a plurality of first electrodes extending in a first direction, a plurality of second electrodes extending in a second direction crossing the first direction, and electro-optical elements driven by the first and second electrodes;
a first driver which drives the first electrodes; and
a second driver which drives the second electrodes,
wherein the first driver has a master IC for driving a first group of the first electrodes, and at least one slave IC for driving a second group of the first electrodes;
wherein the master IC has a display control signal generation section which generates a display control signal based on a signal from an external MPU; and
wherein each of the master IC and the at least one slave IC has an input terminal for receiving the display control signal output from the display control signal generation section of the master IC through an external wiring,
wherein each of the master IC and the at least one slave IC comprises:
a display memory into which display data from the external MPU is written;
a display address circuit which assigns a display address for the display data which is read out from the display memory and displayed in the display section; and
a driver which supplies a data signal based on the display data read out from the display memory to the first electrodes, and
wherein the display control signal input through the input terminal is supplied to the display address circuit and the driver.

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17. (Currently Amended) The electro-optical device as defined in claim
[[4]] 16.
wherein a gray scale display is performed in the display section based on a pulse width modulation signal output from the master IC and the at least one slave IC; and
wherein the display control signal generated in the display control signal generation section includes a gray scale control pulse for generating the pulse width modulation signal.

18. (Previously Presented) The electro-optical device as defined in claim 7,
wherein the signal delay in the internal delay circuit is variable.